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FINAL TECHNICAL REPORT

on

Grant N00014-90-J-1862

Financial Support for the Eleventh U.S. National  
Congress of Applied Mechanics

Submitted by

C. F. Chen

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Department of Aerospace and Mechanical Engineering  
The University of Arizona  
Tucson, Arizona 85721

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THE UNIVERSITY OF ARIZONA  
TUCSON, ARIZONA 85721

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## Final Report on

### "FINANCIAL SUPPORT FOR THE ELEVENTH U.S. NATIONAL CONGRESS OF APPLIED MECHANICS"

#### 1. *Abstract*

The Eleventh U.S. National Congress of Applied Mechanics was held on the campus of The University of Arizona, Tucson, Arizona, May 21-25, 1990. It was a very successful meeting, attracting more than 400 scientists and engineers. The scientific content of the Congress consisted of 5 general lectures, 14 topical symposia, and 65 contributed paper sessions--a total of 356 technical presentations. It was a busy and scientifically exciting period of four and a half days. We look forward to the next Congress to be held at the University of Washington in 1994.

#### 2. *Background of the U.S. National Congress of Applied Mechanics*

The U.S. National Congress of Applied Mechanics is held every four years. Its schedule is offset by two years from the International Congress of Applied Mechanics, which is also held every four years. The first USNCAM was held in 1950 on the campus of the Illinois Institute of Technology, and Congresses have been held without interruption since that time:

1st	1950	Illinois Institute of Technology
2nd	1954	University of Michigan
3rd	1958	Brown University
4th	1962	University of California at Berkeley
5th	1966	University of Minnesota
6th	1970	Harvard University
7th	1974	University of Colorado
8th	1978	University of California at Los Angeles
9th	1982	Cornell University
10th	1986	University of Texas at Austin
11th	1990	University of Arizona, Tucson

The Congress usually attracts a large number of participants, who come from academia, industry, and government laboratories. It is a gathering of research workers engaged in all facets of applied mechanics. It provides a forum for the discussion of current research results and the contemplation of future research directions. It has become an indispensable part of the scientific exchange of information among engineers and scientists working in the field of applied mechanics.

#### 3. *The Scientific Content of the Eleventh Congress*

The Scientific Committee of the Eleventh USNCAM was chaired by Professor Robert Brokey of Ohio State University. The members were:

D. B. Bogy (Berkeley)	M. Goldstein (NASA Lewis)
F. H. Champagne (Arizona)	E. R. Krempf (Rensselaer)
C. F. Chen (Arizona)	S. Leibovich (Cornell)
S. H. Davis (Northwestern)	J. T. Oden (Texas)
C. Desai (Arizona)	K. S. Pister (Berkeley)
D. C. Drucker (Florida)	W. C. Reynolds (Stanford)
L. B. Freund (Brown)	G. S. Springer (Stanford)
Y. C. Fung (UCSD)	Van Dyke (Stanford)
R. H. Gallagher (Clarkson)	

The scientific sessions for each day of the five-day Congress began with a general lecture and were followed by simultaneous sessions of topical symposia. There were fourteen symposia, with a total of 66 invited papers presented. In the afternoon, there were multiple simultaneous sessions of contributed papers covering all aspects of applied mechanics. A total of 285 contributed papers was presented in 65 sessions.

General Lectures were given by:

Stephen H. Davis (Northwestern), "Fluid Mechanics of Solidification"  
Rodney Clifton (Brown), "High Strain Rate Behavior in Solid Structural Mechanics"  
Philip Holmes (Cornell), "Nonlinear Dynamics and Chaos"  
Robert Taylor (UC Berkeley), "Computational Methods in Solid Structural Mechanics"  
Alar Toomre (MIT), "Dynamics of Galaxies"

The following Topical Symposia were conducted at the Congress:

"Fluid Mechanics of Solidification," S. H. Davis (Northwestern) [2 sessions]  
"Turbulence Theories and Modelling," J. M. Wallace (Maryland) [2 sessions]  
"Transition in Wakes of Axisymmetric Bodies," A. J. Pearlstein (Arizona)  
"Receptivity Phenomenon," E. J. Kerschen (Arizona)  
"Mechanics of Solid Interfaces and Films," J. W. Hutchinson (Harvard) and K. S. Kim (Illinois)  
"Mechanics Applied to Living Organisms," Y. C. Fung, R. Skalak, and S. Woo (UC San Diego) [2 sessions]  
"Failure Modes in Dynamic Fracture," A. Rosakis (CIT) and L. B. Freund (Brown)  
"Structural Acoustics and Fluid-Structure Interactions," T. J. R. Hughes (Stanford) and A. Tucker (ONR)  
"Failure of Composite Materials," G. Springer (Stanford) and S. S. Wang (Illinois)  
"Material Instability," R. James (Minnesota) and J. Jenkins (Cornell)  
"Viscoplasticity: Experiment, Modeling and Computation," E. Krempl (Rensselaer) and D. McDowell (GIT)

All general lectures and invited papers were collected in the conference proceedings published by the ASME Press. Abstracts of contributed papers were collected in a volume and distributed to the attendees at the Congress. One copy each of the Congress Proceedings and the Book of Abstracts is submitted with this report.

A banquet was held on Wednesday, May 23, 1990. The highlight of the evening was a program of music from the renaissance and baroque periods given by Collegium Musicum featuring Professor Bill Sears on the recorder and on the drum.

#### **4. Support From Other Agencies**

We solicited financial support from the following University sources, other federal agencies, and industrial organizations:

Office of the Vice President for Research, The University of Arizona  
College of Engineering and Mines, The University of Arizona  
The National Science Foundation  
Allied Signal Aerospace Company  
IBM Corporation  
Salt River Project  
Hughes Aircraft Company  
AG Communication Systems  
Modular Mining Systems

With the generous support of the Office of Naval Research and the above organizations, we were able to set the registration fee at \$175.00, including a copy of the Congress Proceedings.

5. *Budget for the Congress*

I. *Income*

Registration Fee	\$64,473.00
Grants from government agencies (less overhead)	\$40,000.00
Contributions from industry	\$5,750.00
Banquet ticket sales	\$5,850.00
Grants from the Office of VP Research, UofA	\$3,000.00
Grants from the College of Engr. & Mines	\$3,000.00
Received from the previous Congress	\$3,000.00
Total	<u>\$125,073.00</u>

II. *Expenditures*

Conference expenses (administrative charges, publicity, postage, telephone, facilities rental, transportation)	\$60,000.00
Reimbursement of expenses to general lecturers	\$5,005.00
Banquet	\$5,850.00
Reception, coffee breaks	\$14,400.00
Proceedings publication (400 x 25)	\$10,000.00
Secretarial help (1.5 person years)	\$26,818.00
To the next Congress	\$3,000.00
Total	<u>\$125,073.00</u>

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